

# JAPAN

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JIS D 0401 (2000) (English): Automotive  
accessories -- Child restraints

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*The citizens of a nation must  
honor the laws of the land.*

Fukuzawa Yukichi

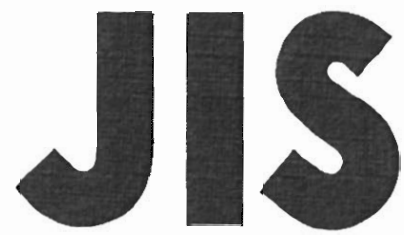
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JAPANESE  
INDUSTRIAL  
STANDARD

Translated and Published by  
Japanese Standards Association

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④ JIS D 0401 : 2000  
(JAPIA/JSA)

**Automotive accessories—  
Child restraints**

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ICS 43.040.60; 97.190

**Descriptors** : private cars, child-restraining devices, seat belts

**Reference number** : JIS D 0401 : 2000 (E)

## Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by the Japan Auto Parts Industries Association (JAPIA)/the Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS D 0401 : 1996** is replaced with this Standard.

In this revision, striving after international conformity in the technical level of safety, it adopts the provisions seemed to be rational from within the regulation of ECE (United Nations Economic Commission for Europe) and FMVSS (Federal Motor Vehicle Safety Standards).

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the original JIS is to be the final authority.

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## Automotive accessories— Child restraints

**1 Scope** This Japanese Industrial Standard specifies requirements for construction, performance and the like of child restraints to be used in automobiles (hereafter referred to as “restraints”).

**2 Normative references** The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

- JIS D 0201 *Automobile parts—General rules of electroplating*
- JIS D 0202 *General rules of coating films for automobile parts*
- JIS D 0204 *Method of high and low temperature test for automobile parts*
- JIS D 1050 *Road vehicles—Techniques of measurement in impact tests—Instrumentation*
- JIS D 1201 *Road vehicles, and tractors and machinery for agriculture and forestry—Determination of burning behaviour of interior materials*
- JIS D 4604 *Automotive parts—Seat belt*
- JIS K 6400 *Test methods for flexible polyurethane foam*
- ISO 845 *Cellular plastics and rubber—Determination of apparent (bulk) density*
- ISO 1798 *Polymeric materials, cellular flexible—Determination of tensile strength and elongation at break*
- ISO 1856 *Polymeric materials, cellular flexible—Determination of compression set*
- ISO 2439 *Polymeric materials, cellular flexible—Determination of hardness*
- ISO 3386-1 *Polymeric materials, cellular flexible—Determination of stress-strain characteristic in compression—Part 1 : Low-density materials*
- ISO 13216-1 *Road vehicles—Anchorages in vehicles and attachments to anchorages for child restraint systems—Part 1 : Seat bight anchorages and attachments*
- DIN 53587 *Bestimmung des Pyrolyserückstandes von siliconkautschuk—Erzeugnissen*

**3 Definitions** For the main terms used in this Standard, the following definitions apply.

- a) **child restraint** A device intended to be attached on an automobile seat by means of any connecting function with a seat belt or seat bight anchorage fixed in the automobile for seating or laying down a child to restrain and/or position him.
- b) **child** A newborn baby, suckling, infant, schoolchild and so forth weighing up to 36 kg.
- c) **guardian** A person who shall protect the child riding together.

- d) **forward-facing** Facing in the same direction as the normal travel direction of the automobile.
- e) **rear-facing** Facing in the direction opposite to the normal travel direction of the automobile.
- f) **car bed** A restraint designed to restrain and/or position the child in a supine or prone position on a continuous surface.
- g) **child seat** A restraint designed not to restrain a child directly by the adult seat belt but to restrain and/or position him in a rear- or forward-facing position by any means of the following devices.

- 1) Impact shield<sup>(1)</sup>
- 2) Combination of impact shield and auxiliary seat<sup>(2)</sup>
- 3) Combination of impact shield, auxiliary seat and child belt
- 4) Combination of child belt and auxiliary seat

Notes <sup>(1)</sup> A device to be secured in front of the child to reduce the impact, as restricting his forward movement, in the event of head-on collision.

<sup>(2)</sup> A device placed on automobile seat to seat a child, which comprises a seat cushion or a seat cushion with seat back.

- h) **booster seat** A restraint designed to restrain and/or position a child suitably so that it is possible to restrain him directly with a seat belt fixed in the automobile.
- i) **child belt** A part of the restraint consisting of webbing, buckle, length adjuster and so forth to restrain a child.
- j) **auxiliary belt** A belt used for securing the restraint, which has been mounted on an automobile seat with the seat belt, to the vehicle seat back and the like to stabilize furthermore as assisting prevention of falling down.

Remarks : A restraint may not be securely held against an impact in the event of traffic accident and the like by using this belt alone.

- k) **universal child restraint** It refers to any of the following 1), 2) and 3).
- 1) **Universal type [I] child restraint** A restraint intended to be restrained or positioned on an automobile seat by means of the vehicle seat belt.
- 2) **Universal type [II] child restraint** A restraint intended to be restrained or positioned on an automobile seat by means of connecting with seat bight anchorages defined in ISO 13216-1.
- 3) **Universal type [III] child restraint** A restraint capable of application as either of universal type [I] and type [II] restraint.
- l) **lock-off device** A device which locks and prevents movement of one section of the webbing of a vehicle seat belt relative to another section thereof. This term covers the following classes.

- 1) **Class A device** A device that prevents the child pulling webbing from the retractor through to the lap belt part, when the seat belt is used to restrain the child directly.
  - 2) **Class B device** A device that allows the retention of an applied tension in the lap belt part of a seat belt to prevent webbing slipping from the retractor, which would release the tension and place the restraint in a non-optimal position, when the seat belt is used to secure the restraint.
- m) **connector** A part of the structure of universal type II or type III child restraint, which is a connecting mechanism provided in a restraint frame for attaching the restraint to a seat bight anchorage.
  - n) **restraint frame** A part mainly composing the restraint other than the child belt.
  - o) **seat cushion** A part of the restraint, which is the seating surface area intended to accommodate waist of the child.
  - p) **seat back** A part of the restraint, which is the leaning back area intended to accommodate head and torso of the child.
  - q) **side support** A part of the restraint provided with seat back, which is a support preventing lateral movement of the head.
  - r) **crotch belt** A restraining component passing through crotch of the child.
  - s) **dummy** An anthropomorphic model of a child.
  - t) **dummy torso** Portion of the body of a dummy in seating position, excluding the upper and lower limbs, that lies between the top of the dummy shoulders and the top of the restraint seating surface.
  - u) **contactable surface** Any restraint frame surface that may contact any part of the head or torso of the dummy, when the dummy is seated on the restraint in a normal position.

#### 4 Division

**4.1 Division of restraints** Restraints are divided by the applicable weighing range of children as given in Table 1.

**Table 1 Division of restraints**

Unit: kg

Division	Weighing range of children
W1	Less than 10
W2	9 or more up to and incl. 18
W3	15 or more up to and incl. 25
W4	22 or more up to and incl. 36

**4.2 Division to restraining system** Forward-facing child seats and booster seats shall not apply to the division W1. Booster seats shall not apply to the division W2.

## 5 Performance

**5.1 Corrosion resistance of restraints** For a restraint of which the metallic part is plated or painted, when it is tested by the method described in 7.3, the effective surface shall meet the criteria specified in 5.4 of JIS D 0201 or 3.5 of JIS D 0202.

### 5.2 Heat resistance of restraints

**5.2.1 Restraint frame** Restraint frames, when tested by the method of 7.4.1 for the heat resistance, shall be free from remarkable deformation, damage, stickiness and the like on any part requiring the function and strength.

**5.2.2 Child belt** Child belts, when tested by the method of 7.4.2 for the heat resistance, shall be free from remarkable warp, damage and the like on any part requiring the function and strength.

**5.3 Flammability of organic materials** Organic materials composing a restraint, when tested by the method described in 7.5, shall meet any of the following criteria.

- a) Not to burn.
- b) The burning velocity does not exceed 100 mm/min when calculated by clause 8 of JIS D 1201.
- c) The test piece stops the combustion before passing 60 s after reaching the marked line A (refers to a straight line passing through a point 38 mm apart from the free end of the burning test piece and parallel to the opening end of the testing fixture defined in JIS D 1201), and also the length burnt shall be less than 50 mm in that duration.

### 5.4 Performance of child belts

**5.4.1 Webbings** Webbings shall be as follows:

- a) The tensile strength, when tested by the method of 7.6.2, shall be as given in Table 2.

**Table 2 Tensile strength of webbings**

Unit: kN

Division	Tensile strength
W1 and W2	3.6 min.
W3	5.0 min.
W4	7.3 min.

- b) For the abrasion resistance, when tested by the method of 7.6.4, the tensile strength shall remain at least 75 % of the value shown before the test.

**5.4.2 Buckle** Buckles shall be as follows:

- a) For the durability, when tested by the method of 7.7.2, there shall be no damage, abrasion or the like on the buckle.
- b) The releasing force (a force required to release the buckle) shall be as follows:
  - 1) Not to be less than 40 N when tested by the method of 7.7.3 a).
  - 2) Not to be released during the test described in 7.9.
  - 3) Not to be exceeding 80 N when tested by the method of 7.7.3 b).

**5.5 Dynamic load performance of restraints**

**5.5.1 General** A restraint, when tested by the methods described in 7.9, shall be free of breakage, and not generate harmful cracks, deformation or the like, that may injure the child, on any element bearing strength retaining function.

**5.5.2 Car bed** During the test described in 7.9, any part of head and torso of the dummy shall be held within the car bed. A part of them, however, may appear temporarily out of the car bed by a rebounding, but it shall be brought back to remain within the car bed when it has come into stable state.

**5.5.3 Rear-facing child seat** To be as follows during the test described in 7.9.

- a) **Behaviour of dummy** Behaviour of the dummy shall be as follows:
  - 1) The centre of gravity of the dummy's head shall not be positioned beyond the upper movement limit line on the child seat indicated in Attached Fig. 1.
  - 2) The dummy shall not be thrown out from the device.
- b) **Maximum angle of seat back inclination** The angle between the seat back surface and the vertical shall not exceed 60° as shown in Attached Fig. 1.

**5.5.4 Forward-facing child seat** To be as follows, during the test described in 7.9.

- a) **Dummy acceleration** When tested by using a dummy of nominal mass 15 kg, the dummy acceleration shall be as follows. Excepting the acceleration at the time of rebounding.
  - 1) In the case of using a 3-year-old dummy, the resultant acceleration determined with the accelerometer mounted on the centre of gravity of the dummy head in triaxial direction shall not exceed 784 n/s<sup>2</sup> for a cumulative duration more than 3 ms. Further, the resultant acceleration determined with the accelerometer mounted on the centre of gravity of the dummy's chest in triaxial direction shall not exceed 588 m/s<sup>2</sup> for a cumulative duration more than 3 ms.
  - 2) In the case of using a 3-year-old manikin, the resultant acceleration determined with the accelerometer mounted on the centre of gravity of the dummy's chest in triaxial direction shall not exceed 539 m/s<sup>2</sup> for a cumulative duration of more than 3 ms. Further, the vertical component of the chest acceleration generating a tensile force between the abdomen and head shall not exceed 295 m/s<sup>2</sup> for a cumulative duration of 3 ms.

b) **Behaviour of dummy** The behaviour of dummy shall be as follows:

- 1) The dummy's head shall not displace beyond 550 mm forward in horizontal distance from point Cr of the seat indicated in Attached Fig. 4. Further, the displacement upward thereof shall not exceed 800 mm in vertical distance.
- 2) Forward displacement of the dummy knee pivots, measured at right angles to the vertical passing through point Cr on the test seat indicated in Attached Fig. 4, shall not exceed 700 mm.
- 3) The dummy shall not be in an abnormal posture and not be thrown out from the device.

**5.5.5 Booster seat** During the test described in 7.9, the dummy or the restraint frame shall not be thrown out from the vehicle seat belt.

## **6 Construction, dimensions and mass**

**6.1 General construction** The general construction of restraints shall be as follows:

- a) To be constructed as being capable of easily fixing with, attaching on and detaching from an automobile seat with the seat belt fixed in the automobile or by means of a connector, and not to displace inordinately or fall down in the event of an impact due to urgent braking, traffic accident and the like.

An auxiliary belt for further stabilizing the restraint fixation may be equipped.

- b) Not to be constructed as being hung over the automobile seat back or inserting any of its part such as legs, except the connector, into a clearance between the seat cushion and seat back.
- c) Car beds shall be designed as restraining and/or positioning a child sideways to the normal travel direction of the automobile.
- d) To be so constructed as that a child can be easily restrained and/or positioned within the restraint, and rescued by the guardian or the third person in the event of emergency.
- e) Not to be constructed as to give the child an unpleasant feeling under a state of ordinary service.
- f) To be so constructed as protecting the child from injury, reducing the damage and having less fear to injure other occupants of the vehicle in the event of impact due to hard braking, traffic accident and so on.
- g) To be constructed as not impair the automobile seat and seat belt.
- h) Components shall be attached or connected securely at their respective attaching and connecting parts.
- i) Child seats having child belt which are to be used in forward-facing position shall be constructed as provided with a crotch belt.
- j) Child belts shall be so constructed as adjustable to snugly fit the circumference of any child seated in the relevant device.

- k) Universal type [II] and type [III] child restraints, other than those of a system with hooks for attaching to anchorage, shall be constructed as making clear signal indicating that the relevant device has fully attached to the anchorage, or visibly recognisable the full attachment in ease. Further, the connector, where the webbing or any soft material alike is applied for the component, shall be constructed to be adjustable to secure the relevant device firmly in an automobile.
- l) For restraints of division W3 and W4, function of attachment through connecting with a seat bight anchorage may be provided. In this case, such device shall be constructed as not to subject the seat bight anchorage to inertial force of the child mass.
- m) Combination of the division of restraints and the attaching system shall be as any of the following.

1) **Division W1 and W2**

	Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage		Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage		Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage
W1	○	×	W1	○	×	W1	×	×
W2	×	×	W2	○	×	W2	○	×

	Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage		Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage		Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage
W1	×	○	W1	×	○	W1	×	×
W2	×	×	W2	×	○	W2	×	○

	Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage		Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage		Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage
W1	○	○	W1	○	○	W1	×	×
W2	×	×	W2	○	○	W2	○	○

## 2) Division W3 and W4

	Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage		Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage		Existence of function of attachment, or restraining a child directly, by using the adult seat belt	Existence of function of attachment by connecting with seat bight anchorage
W3	○	○ or ×	W3	○	○ or ×	W3	×	×
W4	×	×	W4	○	○ or ×	W4	○	○ or ×

Remarks : The mark ○ refers to the case having the relevant function, and the mark ×, not having.

n) Soft connectors shall be fixed permanently in the restraint frame.

## 6.2 Restraint frame

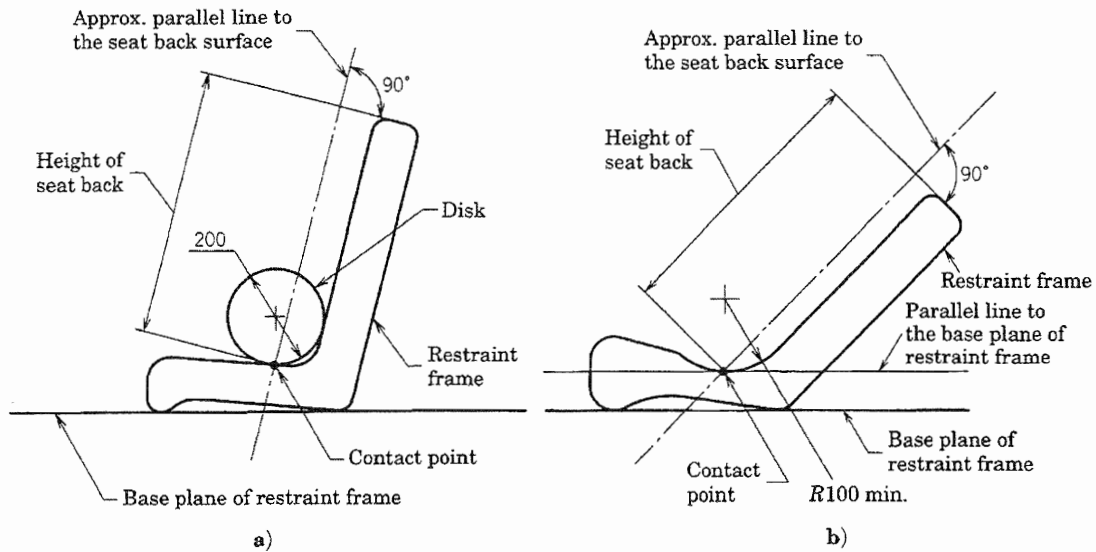
**6.2.1 Shape, dimensions and mass** The shape, dimensions and mass of restraint frames shall be as follows:

- a) For those with a seat back, the height and the width of the part contactable with a child's head (hereafter referred to as "head part") of the seat back shall be as follows:
  - 1) The height of seat back, measured from the contact point of a disc with the seat cushion along a line approximately parallel to the seat back surface as shown in Fig. 1 a), when the disc having a diameter of 200 mm is placed as tangent to both the seat cushion and seat back, shall not be less than the value given in Table 3.

Where two or more contact points of the disc with the seat cushion are found, the height shall be taken at the point, among them, nearest to the restraint frame base. Further, in the case where it is impossible to specify the contact point of the disc with the seat cushion, the measurement shall be done from the point at which a curved surface of 100 mm or more in radius comes in contact with a line parallel to the base plane of the restraint frame which is placed on the horizontal plane, as shown in Fig. 1 b).



Unit : mm



**Fig. 1 Measurement of seat back height**

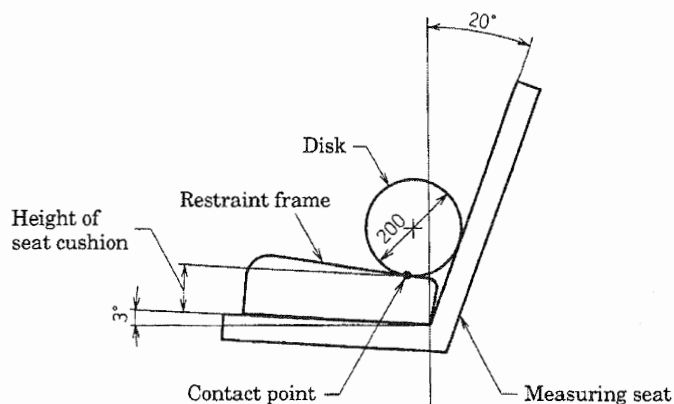
**Table 3 Height of seat back**

Unit: mm

Division	Height of seat back
W1	450
W2	500
W3	550
W4	650

- 2) For the head part, the width shall be at least 100 mm each in both sides from the longitudinal centre line of the restraint frame when measured at the height of the seat back in Table 3 in horizontal direction, or shall be provided with side supports preventing head of child from lateral displacement. The internal dimension of the side supports shall be at least 75 mm each in both sides from the longitudinal centre line of the restraint frame, and its depth measured from the surface of the covering material shall be at least 100 mm.
- b) For the height of seat cushion of a restraint frame having no seat back, when a disc of 200 mm in diameter is placed as tangent to both the restraint frame and measuring seat as shown in Fig. 2, the height of the contact point of the disc with the restraint frame measured from seating surface of the measuring seat shall not exceed the value given in Table 4.

Unit : mm



**Fig. 2 Measurement of height of seat cushion**

**Table 4 Height of seat cushion**

Unit: mm

Division	Height of seat cushion
W2	200
W3	150
W4	100

- c) The mass of restraints that will subject seat bight anchorages to an inertial force shall not be exceeding 15 kg.

**6.2.2 Covering of contactive surface** The contactive surface shall be suitable for service to a child, and covered by soft material appropriately.

**6.2.3 Padding material** For car beds and rear-facing child seats, the hardness and the thickness of padding materials laid between the skin of the portion contactive to a head and surface of the restraint frame internal structure shall be as given in Table 5. In the case of restraint frames having foamed material construction, this does not apply.

The hardness shall be determined according to the method defined in 7.1.

**Table 5 Hardness and thickness of padding materials**

Hardness N	Thickness mm
110 or over to and excl. 390	8 min.
390 or over up to and incl. 2 160	5 min.

**6.2.4 Protrusions** When the restraint frame is tested on the various parts by the method of 7.2, the respective parts shall not show any partial feeling of contact as that the internal structure would injure a child.

**6.2.5 Lock-off device** Lock-off devices, if equipped, shall be as follows.

- a) The lock-off device shall be permanently attached to the restraint.
- b) The lock-off device shall not impair the durability of the seat belt fixed in the automobile.
- c) The lock-off device shall not prevent the rapid release of the child.
- d) For class A devices, the amount of slip of the webbing shall not exceed 25 mm after the test of **7.10.1**.
- e) For class B devices, the amount of slip of the webbing shall not exceed 25 mm after the test of **7.10.2**.

### **6.3 Child belt**

**6.3.1 Webbing** Webbing shall be as follows:

- a) To be a synthetic fibre made into soft and tough narrow woven band with flexibility, having the surface of being smooth, well feel and free of uneven weave, flaws and the like, of which the ends are subjected to loosening proof.
- b) The width, when tested by the method of **7.6.3**, shall be as given in Table 6 at the portion contactive with a dummy.

**Table 6 Width of webbing**

Unit: mm

Division	Width
W1 and W2	25 min.
W3 and W4	38 min.

**6.3.2 Buckle** Buckles shall be as follows:

- a) To be made from material having adequate strength, smooth all over the surface, free from sharp edges and loosening, and desirably refined in the appearances.
- b) The painting and other surface treatment shall be well done to neither be faded nor peeled easily.
- c) The engaging system shall be easily discriminated by guardians.
- d) For push-button type buckles, the push-button shall be that having a shape and dimensions enabling the guardian or third person to easily push down.

The surface of push-button shall be coloured red series, or marked legibly with letters of "PUSH" or "PRESS", as not to discolour or be fade easily.

- e) The shape and dimensions shall not be such that may subject the wearer to excessive pressure or injure him.
- f) To be located in a position that allows it to be released by the guardian with one hand, and further to be released easily by the guardian or any third person in the event of emergency.

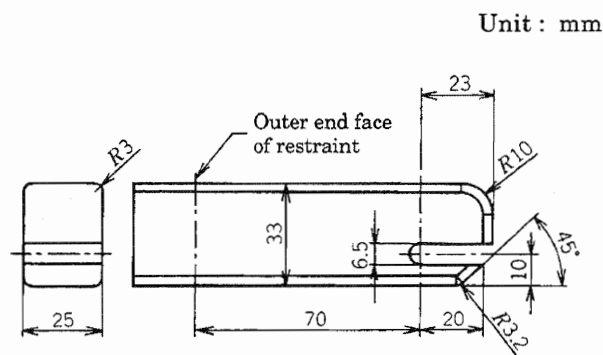
**6.3.3 Adjuster** Adjusters shall be as follows:

- a) Adjusters, by which length of the webbing can be adjusted manually to physique of the wearer, shall be easy to reach when the restraint is correctly installed and the child or dummy is in position.
- b) Every adjuster shall be capable of single hand operation in one smooth action, and easily adjustable to the child's physique.
- c) In a test performed in accordance with 7.8 a), the force required to operate the length adjustment shall not exceed 50 N, and the adjusting device shall not break or become detached.
- d) When tested in accordance with 7.8 b), the amount of strap slip shall not exceed 25 mm for one adjusting device or 40 mm for all adjusting devices.
- e) An adjuster mounted directly on the restraint shall be capable of withstanding repeated operation and shall, before the dynamic load test described in 7.9, undergo a test comprising 5 000 cycles  $\pm$  5 cycles as specified in 7.8 c) 3).

**6.3.4 Retractors** Retractors, if equipped, shall be as follows:

- a) **Retracting force** When tested in accordance with 7.11 a), the retracting force after durability test of 7.11 c) shall be at least 50 % of the value before the test.
- b) **Emergency locking performance** To conform to any of the symbol of V, W, VW or VWe among the classes given in Table 5 of JIS D 4604. Further, when tested according to 7.11 b), to meet the performance of the relevant symbol before and after the durability test of 7.11 c).
- c) **Durability** When tested in accordance with 7.11 c), to be capable of smoothly retracting the webbing without abnormality on any part.

**6.4 Connectors** Connectors, if equipped, shall not be of the size exceeding the maximum external dimensions given in Fig. 3.



**Fig. 3** Maximum external dimensions of connector

**7 Test methods**

**7.1 Hardness test for padding materials** For the hardness test of padding materials, 6.3 of JIS K 6400 shall apply.

**7.2 Feeling test** For the feeling test, with the restraint frame fixed or stabilized on a rigid surface, the restraint frame surface shall be examined for extent of the touch feeling by a palm with a force of at least 294 N applied.

**7.3 Corrosion test** For the corrosion test, **JIS D 0201** or **JIS D 0202** shall apply. In any case, the duration of salt spray shall be 24 h.

#### **7.4 Heat resistance test**

**7.4.1 Heat resistance test for restraint frames** The heat resistance test for restraint frames shall be in accordance with TSH class 4 of **JIS D 0204**. The duration of test shall be 24 h.

**7.4.2 Heat resistance test for child belts** For the heat resistance test for child belts, allow the various components other than webbing to rest at an atmosphere of  $80\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$  in temperature and  $(95 \pm 5)\%$  in relative humidity for 24 h, successively transfer them in a drying chamber of  $80\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$  in temperature and leave them to stand for 24 h, and then take them out to examine for presence of warp, injury and so on likely to impair the performance.

The retractor, if equipped, shall be tested together.

#### **7.5 Flammability test of organic materials**

**7.5.1 Test piece** The test piece shall be as follows:

- a) The test piece shall be any of the following. In the case where two or more different materials are integrated by means of adhesion or stitching, these may be sampled in such integrated state for the test piece.
  - 1) The test piece is made to have dimensions of 350 mm in length and 100 mm in width and the thickness corresponds to the basic thickness dimension of the part for which the material is used. Where the basic thickness of the part exceeds 12 mm, the thickness is to be 12 mm.
  - 2) The test piece may be sampled from a part of product. In this case, the following means shall apply.
    - 2.1) Where impossible to obtain any flat test piece owing to the shape of the material, a test piece is sampled in dimension of 1) from a portion of largest curvature.
    - 2.2) Where test piece of the dimensions of 1) cannot be taken, and also is difficult to be produced, it is made as near as possible to the dimensions.
- b) For those having directional property in combustion extending such as textiles, to coincide the rapidmost burning direction with longitudinal direction of the test piece.
- c) For a test piece having fluffy or bushy surface, placing it on a flat, comb the surface twice in the direction opposite to the fluff by using a tool of at least 110 mm in length and having 7 or 8 teeth with smooth and rounded tips per 25 mm.

**7.5.2 Test methods** For the flammability test of organic materials, a test piece complying with 7.5.1 shall be tested in accordance with clause 7 of JIS D 1201.

Determination of the duration of combustion shall be over when flames have reached the measurement ending point, or when the flames have gone out before reaching the final measuring point. Where the flames do not reach the measurement ending point, the burnt distance shall be measured to the point at which the flames went out. The range of measuring the burnt distance shall be the degenerated part of which the surface or interior is impaired.

## **7.6 Webbing test**

**7.6.1 Test conditions** With a test piece in full width, after allowing it to rest under a temperature of  $20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  and a relative humidity of  $(65 \pm 2)\%$  for 24 h, immediately the following tests in 7.6.2 to 7.6.4 shall be carried out.

Each test piece used shall be that produced under the same conditions.

**7.6.2 Tensile strength test** For the tensile strength test, 7.4 (1.1) of JIS D 4604 shall apply.

**7.6.3 Width test** For the width test, the test piece shall be subjected to a tensile force of 20 N and the width shall be measured.

**7.6.4 Abrasion test** For the abrasion test, 7.4 (2.1) 1) of JIS D 4604 shall apply.

## **7.7 Buckle test**

**7.7.1 Test piece** The respective test pieces to be used for the durability test and releasing force test of buckles shall be those produced under the same conditions.

**7.7.2 Durability test** For the durability test, 7.5 a) of JIS D 4604 shall apply.

**7.7.3 Releasing force test** The releasing force test shall be as follows:

- a) **Initial releasing force test** On a new buckle with no loading of tensile force and the like, a force shall be applied in the direction as producing maximum releasing effect onto the vicinity of centre of the push-button to measure the force at releasing.
- b) **Test for releasing force after dynamic load test** After completion of the test of 7.9, this test shall be carried out in the following procedure.
  - 1) With the posture of dummy held as stable as possible, attach strings to the upper and lower both limbs being in approximately horizontal position as shown in Attached Fig. 2.
  - 2) Pulling the strings in the direction approximately parallel to the vertical section of the test seat and also between the horizontal line and vertical line to the seat back surface of test seat as shown in Attached Fig. 2, to apply the pulling force given in Table 7. For a car bed or rear-facing child seat, the restraint may be moved so as to allow the releasing force to be measured.

**Table 7 Tensile force**

Nominal mass of the dummy used for test kg	Tensile force N
9 or under	88
Over 9 up to and incl. 20	196
Over 20	Force equivalent to gravity acting on the nominal mass of dummy

- 3) Apply a force in the direction as producing maximum releasing effect onto vicinity of centre of the releasing push-button, while the tensile force of 2) is being applied, to measure the force at releasing.

## **7.8 Adjuster test**

### **a) Test for ease to use**

- 1) When testing a manual adjusting device, the strap shall be drawn steadily, having regard for the normal conditions of use, at a rate of 100 mm/min  $\pm$  20 mm/min and the maximum force measured to the nearest integer value of N after the first 25 mm  $\pm$  5 mm of strap movement.
- 2) The test shall be carried out in both directions of strap travel through the device, with the strap having been subjected to full travel cycle 10 times prior to the measurement.

### **b) Microslip test (see Attached Fig. 3)**

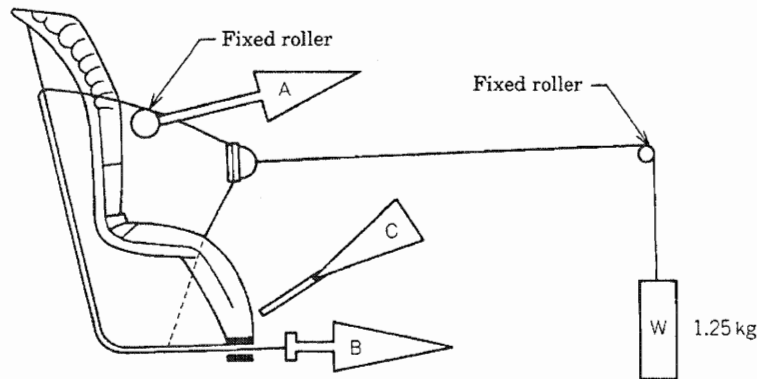
- 1) The components or devices to be subjected to the microslip test shall be kept for a minimum of 24 h before testing in an atmosphere having a temperature of 20 °C  $\pm$  5 °C and a relative humidity of (65  $\pm$  5) %. The test shall be carried out at a temperature between 15 °C and 30 °C.
- 2) The free end of the strap shall be arranged in the same configuration as when the device is in use in the vehicle, and shall not be attached to any other part.
- 3) The adjusting device shall be placed on a vertical part of strap one end of which bears a load of 50 N  $\pm$  0.5 N (guided in a manner which prevents the load from swinging and the strap from twisting). The free end of the strap from the adjusting device shall be mounted vertically upwards or downwards as it is in the vehicle. The other end shall pass over a deflector roller. The roller horizontal axis shall be parallel to the sectional plane of strap supporting the load with the section of strap passing over the roller being horizontal.
- 4) The device being tested shall be arranged in such a way that its centre, in the highest position to which it can be raised, is 300 mm  $\pm$  5 mm from a support table, and the load of 50 N shall be applied at 100 mm  $\pm$  5 mm from that support table.

- 5) After completion of pretest 1 000 cycles  $\pm$  5 cycles shall then be completed at a frequency of 30 cycles/min  $\pm$  10 cycles/min. The 50 N load shall be applied only during the time corresponding to a shift of 100 mm  $\pm$  20 mm for each half period. Microslip shall be measured from the position at the end of the 20 pretest cycles.

c) **Conditioning test for adjusters mounted directly on a child restraint**

- 1) Preparation of the test shall be as follows:
  - 1.1) Install the largest dummy for which the restraint is intended, adjust the child belt in accordance with 1) and 2) of 7.9.2 e), and mark a reference line on the webbing where the free end of the webbing enters the adjuster.
  - 1.2) Remove the dummy and place the restraint in the conditioning rig shown in Fig. 4.
  - 1.3) Allow the webbing to move so that 100 mm of webbing on the side of the reference line toward the webbing free end and the remainder of the moving distance (approximately 50 mm) on the integral harness side of the reference line moves through the adjuster. If the length of webbing from the reference line to the webbing free end is insufficient for the movement described above, the movement of 150 mm through the adjuster shall be from the fully extended harness position.
- 2) The test method shall be as follows:
  - 2.1) With the webbing set at the position of reference line described in 1), withdraw at least 50 mm of webbing from the integral harness by pulling on the webbing free end.
  - 2.2) Attach the adjusted part of the integral harness to the pulling device A.
  - 2.3) Activate the adjuster and pull at least 150 mm of webbing into the integral harness. This represents half of one cycle and puts pulling device A to the maximum webbing extraction position.
  - 2.4) Connect the webbing free end to pulling device B.
- 3) The cycle of test shall be as follows:
  - 3.1) Pull B at least 150 mm whilst A exerts no tension on the integral harness.
  - 3.2) Activate the adjusters and pull A whilst B exerts no tension on the free end of the webbing.
  - 3.3) At the end of stroke, de-activate the adjuster.
  - 3.4) Cycle the webbing for a total distance of not less than 150 mm through the adjuster.
  - 3.5) The frequency of cycling shall be 10 cycles/min  $\pm$  1 cycle/min, with a velocity on B of 150 mm/s  $\pm$  10 mm/s.





**Fig. 4 Conditioning for adjusters mounted directly on a restraint**

## **7.9 Dynamic load test**

**7.9.1 Test apparatus** The test apparatus, consisting of a trolley, propelling device, test seat, dummy and measuring equipment, shall be as follows:

- a) The trolley and propelling device shall have a rigidity sufficient to support the test seat, dummy, seat belt, restraint and so on, and bear, with full attachment of them, repeated measurement of the velocity and acceleration or deceleration of trolley specified in 7.9.3 b).
- b) The test seat used shall be as follows:
  - 1) The seat back of test seat, as shown in Attached Fig. 4, shall be a rigid back fixed.

The upper and lower edges of front face of the rigid back shall be rounded in 10 mm R.
  - 2) The seat cushion of test seat, as shown in Attached Fig. 4, shall be a rigid seating fixed.

The front and rear edges of upper face of the rigid seating shall be rounded in 10 mm R.
  - 3) The width of the seat back and the seat cushion of test seat shall be 800 mm.
  - 4) The seat back and the seat cushion of test seat shall be covered with polyurethane foam, the characteristics of which are given in Table 8, and further have the dimensions as given in Attached Fig. 4.

**Table 8 Characteristics of polyurethane foam**

Item	Reference value	Remarks
Density (kg/m <sup>3</sup> )	43	According to <b>ISO 845</b> .
Bearing pressure strength (N)		According to <b>ISO 2439</b> .
p-25 %	125	
p-40 %	155	
Bearing pressure factor (kPa)	4	According to <b>ISO 3386-1</b> .
Elongation at rupture (%)	180	According to <b>ISO 1798</b> .
Breaking strength (kPa)	100	According to <b>ISO 1798</b> .
Compression set (%)	3	According to <b>ISO 1856</b> .

- 5) The seat of 4) shall be covered with a sun shade cloth, made of polyacrylate fibre, the characteristics of which are given in Table 9.

**Table 9 Characteristics of polyacrylate fibre made sun shade cloth**

Item	Reference value	Remarks
Mass per unit area (g/m <sup>2</sup> )	290	
Breaking strength (N)		According to <b>DIN 53587</b> on test specimen 50 mm wide.
Lengthwise	120	
Breadthwise	80	

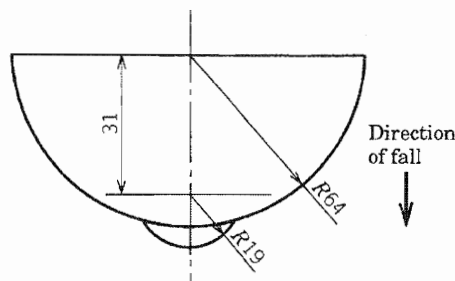
- 6) Covering of the seat cushion and the seat back of test seat shall be as follows:
- 6.1) The seat cushion shall be produced out of a square foam block (800 mm × 575 mm × 135 mm) made from polyurethane foam conforming to Table 8 into the shape shown in Attached Fig. 4.
- 6.2) The aluminium bottom-plate, in which six holes shall be drilled alongside the largest side of the plate, three on each side, in order to fasten it to the trolley, and be fixed with bolts and nuts (see Attached Fig. 5).
- It is recommended to glue the bolts on the aluminium bottom-plate with an appropriate adhesive.
- 6.3) The cover material shall be cut in 1 250 mm × 1 200 mm (see Attached Fig. 6) so that there is a gap of about 100 mm between the edges to enable them not to overlap after covering.
- 6.4) The cover material shall be marked with two lines at the position 375 mm apart from the centre line (see Attached Fig. 6).
- 6.5) The seat cushion shall be placed upside down on the cover material with the aluminium bottom-plate on top.

- 6.6) The cover material shall be stretched until the lines drawn on it match both edges of the aluminium bottom-plate. Then, small incisions shall be made at each bolt position and the cover material shall be pulled over the bolts.
- 6.7) At the position of the grooves in the bottom plate and in the foam the cover material should be incised.
- 6.8) The cover shall be glued to the aluminium bottom-plate with a flexible adhesive.

The nuts shall be removed before gluing.

- 6.9) The flaps on the side shall be folded onto the plate to be glued as well.
  - 6.10) The flaps in the grooves shall be folded inside to be taped with a strong tape.
  - 6.11) The flexible adhesive shall be dried for at least 12 h.
  - 6.12) The seat back of test seat shall be covered in exactly the same way as the seat cushion. Excepting that the cover material shall be cut in 1 250 mm × 850 mm and marked with two lines drawn 320 mm apart from the centre line.
- 7) Line Cr shall be coincident with the intersection line between the top plane of seat cushion and the front plane of seat back of the test seat.
  - 8) The test seat shall be as follows:
    - 8.1) For the measurement, **JIS D 1050** shall apply.
    - 8.2) The measuring equipment shall correspond to the specification of a data channel, with a channel frequency class (CFC) 60. Using the test device defined in **b) 8.4**), conduct 3 tests at 150 mm ± 5 mm from the front edge of the cushion on the centre line and also 150 mm ± 5 mm in each direction from the centre line.
    - 8.3) Place the test seat vertically on a flat rigid surface. Lower the impact mass until it contacts the surface and set the penetration marker to the zero position. Place the test seat vertically above the test point, raise the mass 500 mm ± 5 mm and allow it to fall freely to make impact on the seat surface.
    - 8.4) The head form of the impact mass shall consist of a solid wooden hemisphere with an added spherical segment as shown in Fig. 5. The hemisphere shall be constructed so that it can be dropped freely along the axis marked and it shall have projection for mounting an accelerometer in order to measure the acceleration along the direction of fall. The impact mass shall have a total mass, including the accelerometer, of 2.75 kg ± 0.05 kg.
    - 8.5) The peak value recorded shall not deviate by more than 15 % from the initial value.

Unit : mm



**Fig. 5 Head form of impact mass**

- c) The dummy used for the test shall be of the nominal mass given in Table 10 according to the division defined in Table 1. For application of nominal mass 15 kg dummy to a forward-facing child seat, either 3-year-old dummy or 3-year-old manikin shall be used.

**Table 10 Nominal dummy mass**

Unit: kg

Division	Nominal dummy mass
W1	3.4 and 9 (To add 7.7 if needed)
W2	9 and 15
W3	15 and 22
W4	22 and 32

- d) The measuring equipment, consisting of measuring devices for the velocity of trolley, for the acceleration or deceleration of trolley, for the acceleration acting to dummy and for the behaviour of dummy and restraint, shall be as follows:

- 1) The measuring device for the trolley speed shall be an instrument suited for the trolley and propelling device used in the test, having a measuring unit of velocity within 0.5 km/h.
- 2) The acceleration or deceleration of trolley shall be measured in the direction of the trolley lengthwise.

The maximum capacity of the accelerometer used shall be  $980 \text{ m/s}^2$ , and the frequency characteristic of the measuring instrument shall correspond to a CFC 60 of **JIS D 1050**. Where calculating the trolley speed from the acceleration or deceleration, it shall correspond to a CFC 180.

- 3) On each centre of gravity of the head and the chest of a dummy, after measurements for the acceleration in three axes of lengthwise, breadthways and vertical direction, the resultant accelerations shall be calculated.

The maximum capacity of the accelerometer used shall be  $4\,900 \text{ m/s}^2$ , and the frequency characteristic of the measuring instrument shall correspond to a CFC 1 000 of **JIS D 1050** for the measurement on the centre of gravity of head, and a CFC 180 for the measurement on the centre of gravity of chest.

- 4) The measuring device for the behaviour of dummy and restraint shall be capable of filming at a frequency of at least 500 frames/s and be suitable for analysis of the behaviour.

The optical axis of lens of the filming device shall be regulated at right angles to the travelling direction of trolley.

**7.9.2 Preparation of test** The preparation of test shall be as follows:

- a) The travel of trolley shall be directed in the front of actual vehicle for a deceleration type trolley and in the rear of actual vehicle for an acceleration type trolley.
- b) The test seat shall be fixed on the trolley so that the plane of its mid longitudinal section is in parallel to the travelling direction of trolley.
- c) Where testing on universal type [I] child restraints, the restraint shall be secured to the test seat, by using a seat belt defined in Attached Fig. 7, in a way described below. In the case of restraint having adjustable function such as reclining chair, it shall be attached to be tested on the respective positions, which are the lean-most position for a rear-facing child seat and both of the lean-most and upright-most positions for a forward-facing child seat. The lock-off device, if it is equipped, may be used. Any auxiliary belt, however, shall not be used. Further, the connector shall not be connected, if fitted in the relevant restraint, to the seat bight anchorage.

Those intended only for 2-point seat belt shall be tested with a 2-point seat belt, those intended only for 3-point seat belt, with a 3-point seat belt and those intended for both of 2-point and 3-point seat belt, with each of 2-point belt and 3-point belt.

In these cases, the contact point of supporting main load between the restraint and seat belt shall be apart at least 150 mm from point Cr when measured with the relevant restraint being placed on the test seat. This applies to every adjustment configuration.

- 1) For securing a car bed or child seat by using a 2-point seat belt.
  - 1.1) Positioning the restraint, fit a dummy as specified in e).
  - 1.2) Adjust the lap belt to achieve a tension load of  $75 \text{ N} \pm 5 \text{ N}$  at position 1 of Attached Fig. 9.
- 2) For securing a car bed or child seat with a 3-point seat belt.
  - 2.1) Positioning the restraint, fit a dummy as specified in e).
  - 2.2) Adjust the lap belt to achieve a tension load of  $50 \text{ N} \pm 5 \text{ N}$  at position 1 in Attached Fig. 9, make a chalk mark on the webbing where it passes through the buckle. Whilst maintaining the webbing at this position adjust the shoulder belt to achieve a tension of  $50 \text{ N} \pm 5 \text{ N}$  at position 2 in Attached Fig. 9 by either locking in webbing at the restraint webbing locker or by pulling the webbing close to the retractor.
  - 2.3) Extract all webbing from the retractor spool and allow the tension in the belt between the retractor and pillar loop to the retractor tension. The spool shall be locked prior to the dynamic load test.

- 2.4) Position 1 is an outboard position as indicated in Attached Fig. 9.
- 2.5) Position 2 is a convenient position behind the restraint between the lock-off device, if it is fitted to function to the shoulder belt, and the buckle as shown in Attached Fig. 9.

If no lock-off device is fitted or if the lock-off device is fitted at the buckle, it shall be a convenient position between the pillar loop and the restraint.
- 2.6) Complete the installation of the restraint to the test seat.
- 2.7) Remove the hinged board (or flexible device).
- 3) For booster seats, fixing the seat belt to the seat belt attachment, place the booster seat on the test seat to secure it by such a way that described in e) 3).
- d) Where testing on universal type [II] child restraints, the restraint shall be installed in the test seat through connecting to the seat bight anchorage of the test seat (see Attached Fig. 8) by such a way that not using the seat belt but according to the means indicated by the manufacturer of the restraint or the automobile. In the case of restraints having such an adjustable function as reclining device, these shall be fixed to be tested on the respective positions, which are in the lean-most position for rear-facing restraints or both lean-most and upright-most positions for forward-facing restraints.
- e) Position a dummy appropriate according to Table 10. For the case of restraints in division W1 having plural restraining configurations, the lightest and heaviest dummies shall be used as conforming to the weighing range for each restraining configuration.
  - 1) Car beds shall be as follows:
    - 1.1) The dummy shall be stabilized horizontally as close as possible to the centre line of the car bed.
    - (1.2) For those equipped with a child seat belt, place a hinged board or a similar flexible device 25 mm thick and 60 mm wide between the dummy and the base of car bed. The board should follow as closely as possible the curvature of the base of car bed. Then, adjust the child belt in accordance with the manufacturer's instruction, but to a tension of  $250\text{ N} \pm 25\text{ N}$  above the minimum relevant adjusters force (if having two or more adjusters, the value gained by dividing  $250\text{ N} \pm 25\text{ N}$  by number of the adjusters), with a deflection angle of the strap at  $45^\circ \pm 5^\circ$ , or the angle prescribed by the manufacturer.
  - 2) Child seats shall be as follows:
    - 2.1) With the mid longitudinal section of the dummy head being in coincidence with the plane of mid longitudinal section of the restraint, seat the dummy in the position so that its back comes in contact with the restraint seat back. Stretch both upper limbs of the dummy vertically upward and extend both lower legs together with the thighs horizontally forward as far as possible with both leg joints being at right angles.
    - 2.2) In the case of rear-facing restraints, the dummy head may be held against the backrest of the restraint using a light-weight masking tape of sufficient length and width prior to the dynamic load test.

- 2.3) For those equipped with child belt, place a hinged board or a flexible device 25 mm thick and 60 mm wide between the dummy and seat back. The board should follow as closely as possible the curvature of the seat back. Then, adjust the child belt in accordance with the manufacturer's instruction, but to a tension of  $250 \text{ N} \pm 25 \text{ N}$  above the minimum relevant adjusters force (if having two or more adjusters, the value gained by dividing  $250 \text{ N} \pm 25 \text{ N}$  by number of the adjusters), with a deflection angle of the strap at  $45^\circ \pm 5^\circ$ , or the angle prescribed by the manufacturer.
- 2.4) Lower the dummy's both upper and lower limbs in parallel to the plane of dummy mid longitudinal section until a part of both the upper and lower limbs come into contact with the surface of the restraint frame or test seat.
- 2.5) The longitudinal plane passing through the centre line of the dummy shall be set at the mid-point of the line connecting the respective mid-points of the two lower belt anchorages.
- 3) Booster seats shall be as follows:
  - 3.1) Seat the dummy in the seated position of the restraint. Stretch the dummy's both upper limbs vertically upward and extend forward parallel both lower legs together with both thighs, as far as possible, with both leg joints being at right angles.
  - 3.2) Fitting the seat belt, lower the dummy's both upper and lower limbs parallel to the plane of dummy mid longitudinal section until a part of both the upper and lower limbs come into contact with the surface of the restraint frame or test seat.
  - 3.3) In the case of booster seats to be tested with the dummy representing a 10-year-old child, the longitudinal plane passing through the centre line of the dummy shall be positioned  $75 \text{ mm} \pm 5 \text{ mm}$  to the left or right with regard to the point midway between the two belt anchorages. Further, the shoulder belt may be positioned on the dummy, prior to the dynamic load test, by using a light-weight masking tape of sufficient width and length.

**7.9.3 Test** After the preparation has been done in accordance with 7.9.2, tests shall be carried out under the following conditions.

- a) Universal type [III] child restraints shall be subjected to both tests for universal type [I] and type [II] child restraint.
- b) The trolley speed and the acceleration or deceleration of trolley shall be as follows:
  - 1) The trolley speed shall be  $50_{-2}^0 \text{ km/h}$ .
  - 2) The acceleration or deceleration curve of trolley shall remain within the hatched area shown in Attached Fig. 10.
- c) During the test, behaviour of the dummy and the restraint shall be observed and, in the case of using a dummy of nominal mass 15 kg, the acceleration or deceleration on the head and the chest shall be determined.

- d) After the test, the buckle releasing force shall be tested in accordance with 7.7.3 b), and then the restraint shall be examined for state of breakage, harmful flaw, deformation, etc. on every part.

**7.9.4 Test report** The test report shall bear the following matters.

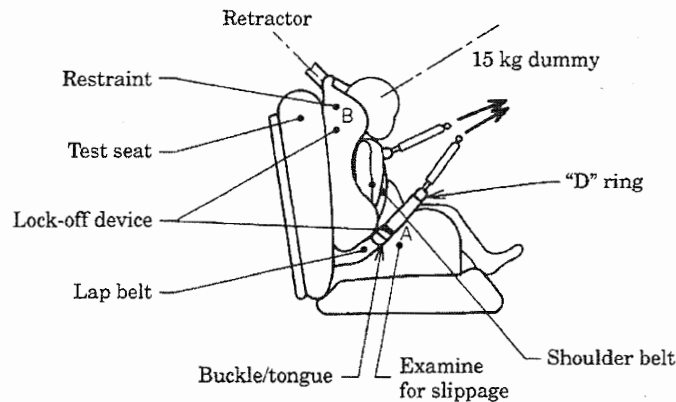
- a) Speed of impact of trolley
- b) Acceleration or deceleration curve and maximum acceleration or deceleration of trolley
- c) For nominal mass 15 kg dummy, triaxial acceleration on the head centre of gravity or vertical component of chest acceleration working toward head from abdomen, triaxial acceleration on the chest centre of gravity, curve of resultant acceleration, maximum resultant acceleration and duration time at the maximum permissible value being exceeded
- d) Behaviour and moving amount of dummy and maximum inclination angle of restraint
- e) Releasing force of buckle
- f) Existence of breakage, harmful flaw or deformation and the like of restraint
- g) Type of testing apparatus
- h) Dummy manufacturer's name, type name and actual mass

#### **7.10 Lock-off device test**

**7.10.1 Test on class A devices** Class A lock-off devices shall be tested as follows:

- a) Set up the restraint and the largest dummy for which the restraint is intended as shown in Fig. 6. The webbing used shall be as shown in Attached Fig. 7.
- b) With the lock-off fully applied, a mark shall be made on the belt where the belt enters the lock-off.
- c) Attaching a force gauge to the belt via a D ring, apply a force equal to twice ( $\pm 5\%$ ) the mass of the heaviest dummy of division W2 for 1 s. The lower position shall be used for lock-offs in position A and the upper position for lock-offs in position B.
- d) Apply the force for a further 9 times. Then, make a further mark on the belt where it enters the lock-off to measure the distance between the two marks.
- e) During the test, the retractor shall be unlocked.

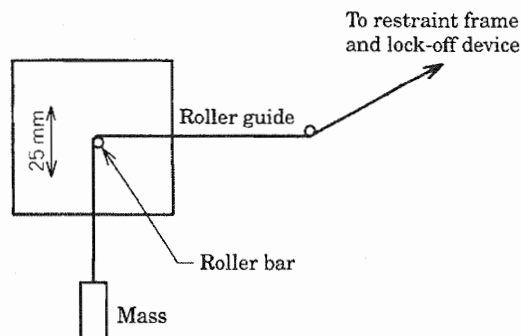




**Fig. 6 Class A lock-off device test**

**7.10.2 Test on class B devices** Class B lock-off devices shall be tested as follows:

- With the restraint secured firmly, allow the webbing, as specified in Attached Fig. 7, to pass through the lock-off and frame following the routing described in the manufacturer's instruction. The belt shall pass through the testing equipment as shown in Fig. 7 and be attached to a mass of  $5.25 \text{ kg} \pm 0.05 \text{ kg}$ . There shall be  $650 \text{ mm} \pm 40 \text{ mm}$  of free webbing length between the mass and the point where the webbing leaves the frame.
- With the lock-off applied fully, make a mark on the belt where it enters the lock-off.
- Raise and release the mass so that it falls freely over a distance of  $25 \text{ mm} \pm 1 \text{ mm}$ . This shall be repeated  $100 \text{ times} \pm 2 \text{ times}$  at a frequency of  $60 \text{ cycles/min} \pm 2 \text{ cycles/min}$  to simulate the jerking action of the restraint in a car.
- Make a further mark on the belt where it enters the lock-off to measure the distance between the two marks.
- The lock-off device shall cover the full width of the webbing under the condition installed with 15 kg dummy. This test is to be conducted using the same webbing angles as those formed in normal use, where the free end of the lap belt portion shall be fixed. The test shall be conducted with the relevant restraint firmly attached to the test seat used in the dynamic load test. The loading strap may be attached to the simulated buckle.



**Fig. 7 Schematic layout of test equipment for class B lock-off device**

- Remarks 1 Drop height of mass: 25 mm  
2 Distance from roller bar to roller guide: 300 mm  
3 To use webbing specified for the seat belt as defined in Attached Fig. 7.

#### 7.11 Retractor test

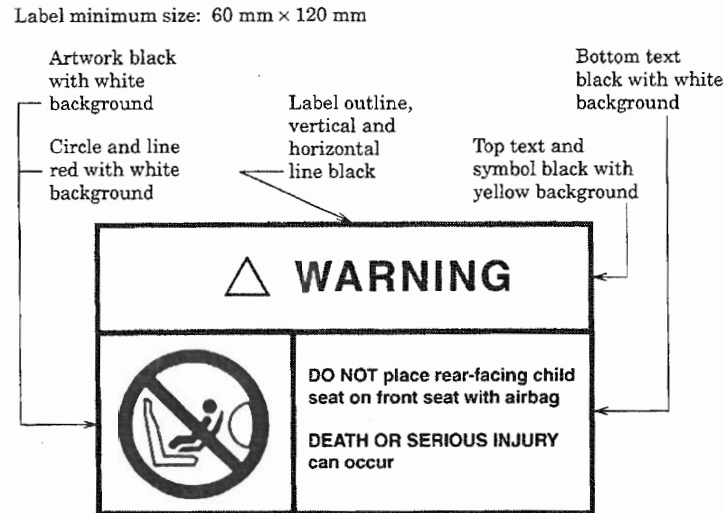
- a) **Retracting force test** The retracting force shall be tested, according to the method specified in 7.8 (1) of **JIS D 4604**, before and after the test of c).
- b) **Emergency locking test** The emergency locking shall be tested, according to the method specified in 7.8 (2) of **JIS D 4604**, before and after the test of c). For the tests, the position of webbing shall be at a withdrawal of 300 mm. The attaching angle of retractor shall be that indicated by the manufacturer.
- c) **Durability test** For the durability test, 7.8 (4) of **JIS D 4604** applies.

**8 Marking** Restraints shall be marked indelibly with the following information, besides those imposed in other regulation and the like, on conspicuous portions.

- a) Division of the restraint and the weighing range of child
- b) Method of installation in automobile and applicable type of seat belt
- c) Manufacturer's name or abbreviation
- d) Year of product or its abbreviation
- e) Serial number
- f) The place where manufacturer's instructions are kept on the restraint
- g) If the seat belt routings to a restraint differ in the installations of forward-facing and rear-facing, the distinction shall be marked clearly by color coding.

The color for that purpose shall be red when the restraint is installed forward facing, and blue when it is installed rear facing, which shall not be easily discolored or effaced.

- h) For rear-facing restraints, the label as defined in Fig. 8 shall be attached permanently on the immediate area of child's head and on the visible surface.



**Fig. 8 Warning label**

i) Other necessary information

Example 1 Where an auxiliary belt is provided

Not to fix this child seat only with the auxiliary belt.

Example 2 For a rear-facing child seat

Not to place this child seat on front seat with air bag.

**9 Instructions** Restraints shall be accompanied by instructions containing the following information, besides that imposed in other regulation and the like.

a) **Means for prevention of danger**

Example 1 To fix the restraint securely with the seat belt, even when no child is seated or laid down. If not fixed, the restraint can be thrown out, on the occasion of collision, to injure other occupant of the car.

Example 2 This car bed is to be placed on immediate midsection as the child's head not being in the car door side.

Example 3 In the case of child seat intended for both forward-facing and rear-facing.

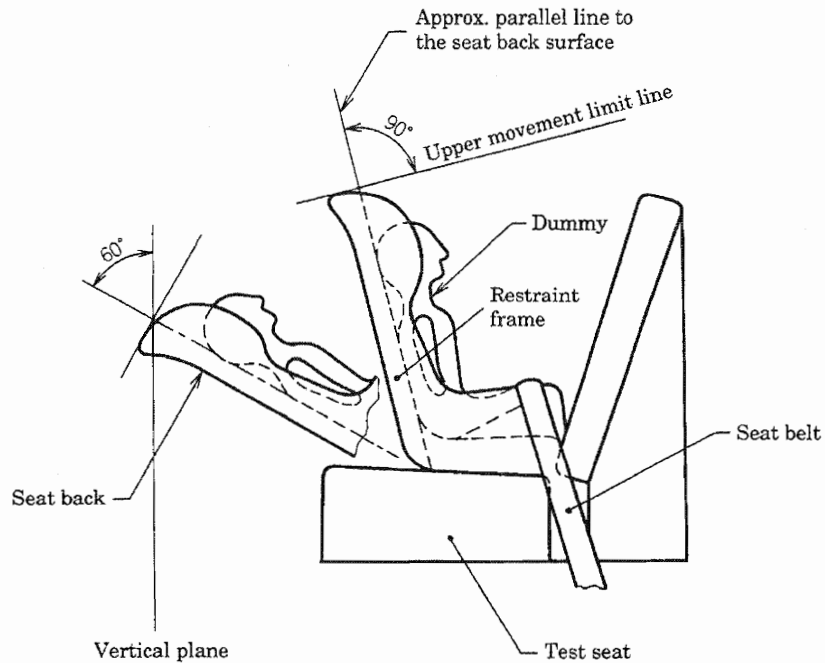
For using the child seat in rear-facing position, not to place it on the front seat with air bag, as injury or the like can occur on the child owing to a contact between the developed air bag and the rear-facing seat.

Example 4 In the case of rear-facing child seat

For using this child seat, not to place it on the front seat with air bag, as injury or the like can occur on the child owing to a contact between the developed air bag and the rear-facing seat.

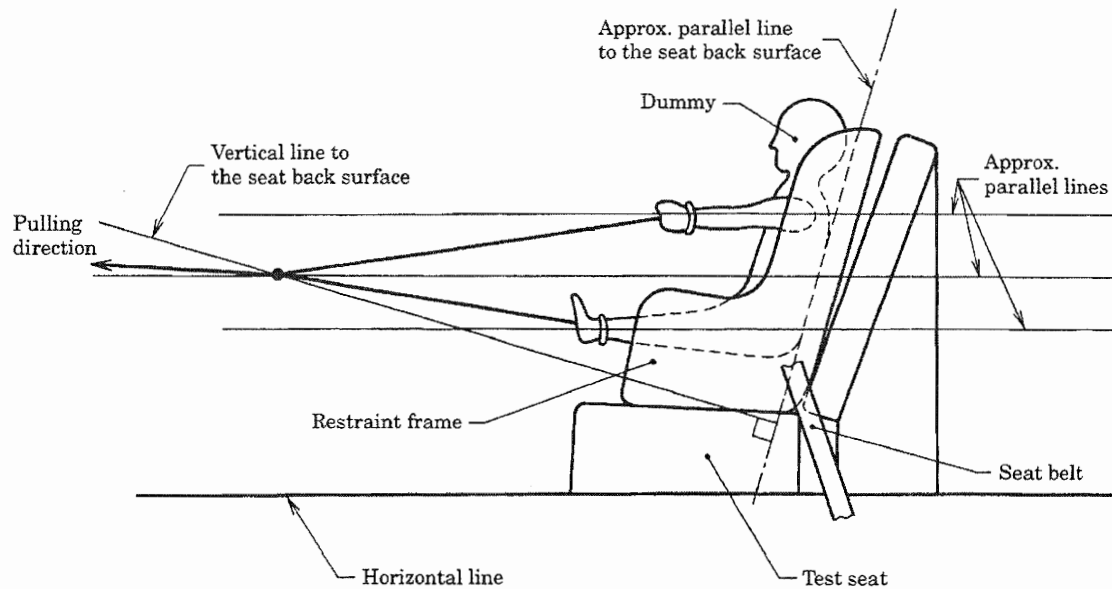
b) Every child restraint shall have a location on the restraint for storing the manufacturer's instructions.

- c) How to maintenance
- d) Period of replacement



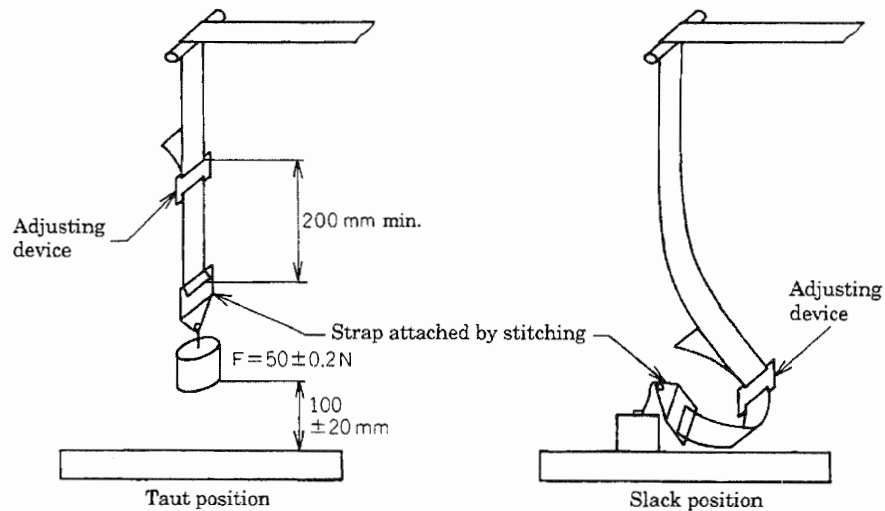
Remarks : The test on an universal type [I] child restraint is illustrated here. In the case of universal type [II] child restraints, not using seat belt, the connector of which is fitted to seat bight anchorage of the test seat.

**Attached Fig. 1 Configuration of rear-facing restraint under dynamic load test**



Remarks : This drawing shows the test on an universal type [I] child restraint. For testing on universal type [II] child restraints, such a restraint is fixed to seat bight anchorage of the test seat, without using the seat belt indicated in the drawing. In the case of testing on universal type [III] child restraints, the test of Attached Fig. 2 and that for universal type [II] child restraints shall be applied.

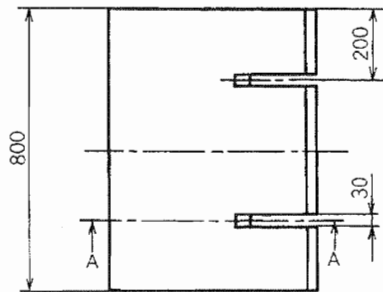
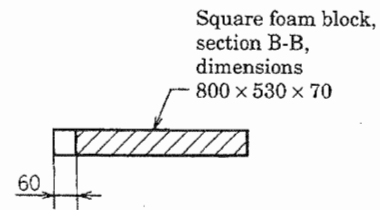
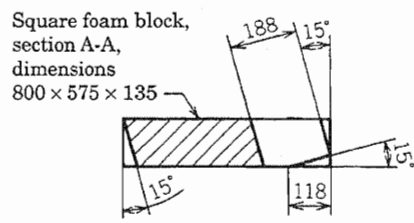
**Attached Fig. 2 Testing for releasing force of buckle**



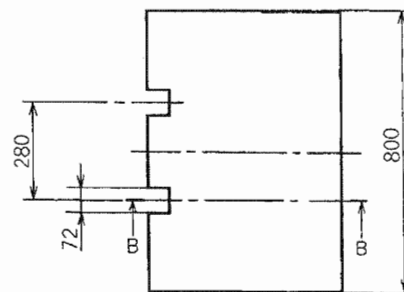
Remarks : The load of  $50 \text{ N} \pm 0.5 \text{ N}$  shall be guided vertically as to prevent load-swing and twisting of strap. The attaching device shall be fixed to the load of  $50 \text{ N}$  in the same manner as in the vehicle.

**Attached Fig. 3 Microslip test**

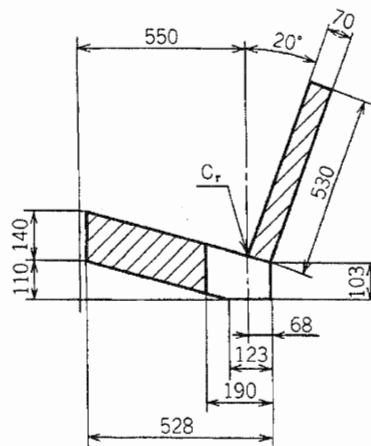
Unit : mm



a) Seat cushion of test seat



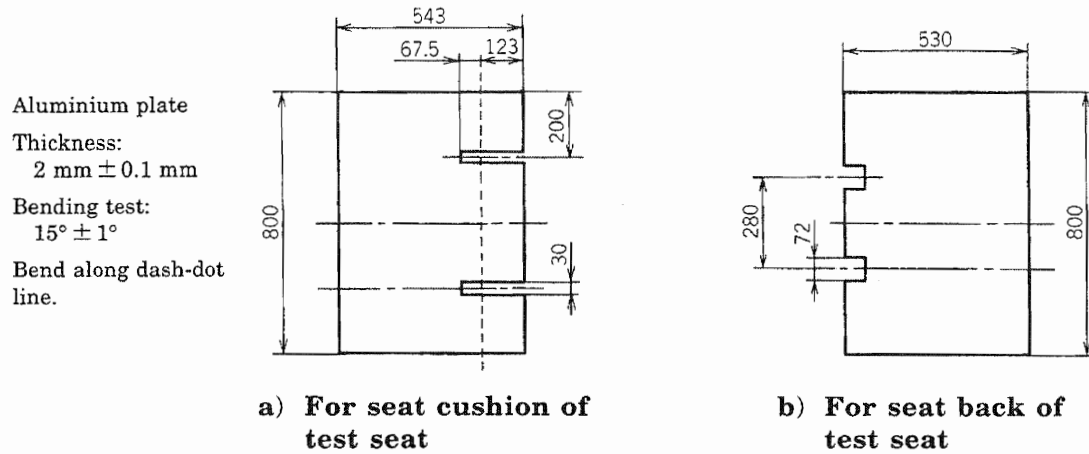
b) Seat back of test seat



c) Section of test seat

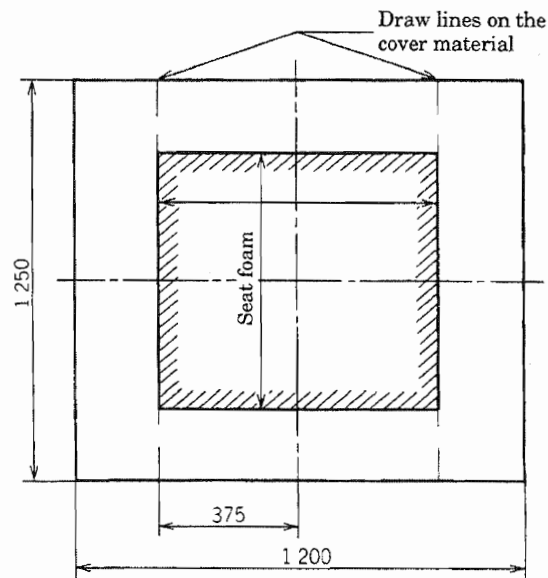
Attached Fig. 4 Dimensions of seat back and seat cushion of test seat

Unit : mm



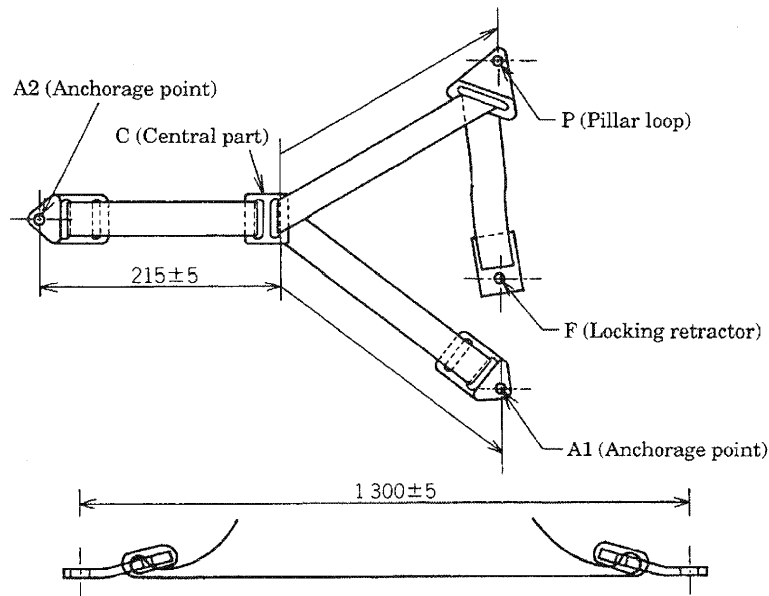
Attached Fig. 5 Dimensions of aluminium bottom-plate

Unit : mm



Attached Fig. 6 Dimensions of cover material

Unit : mm



Remarks 1 The distance of P-A1, measured parallel to the centre line of the webbing, shall be  $2\,190 \pm 5$  mm. Then the webbing withdrawal on the retractor spool shall be  $150 \pm 5$  mm.

2 The strap requirements for the retracting belt are as follows:

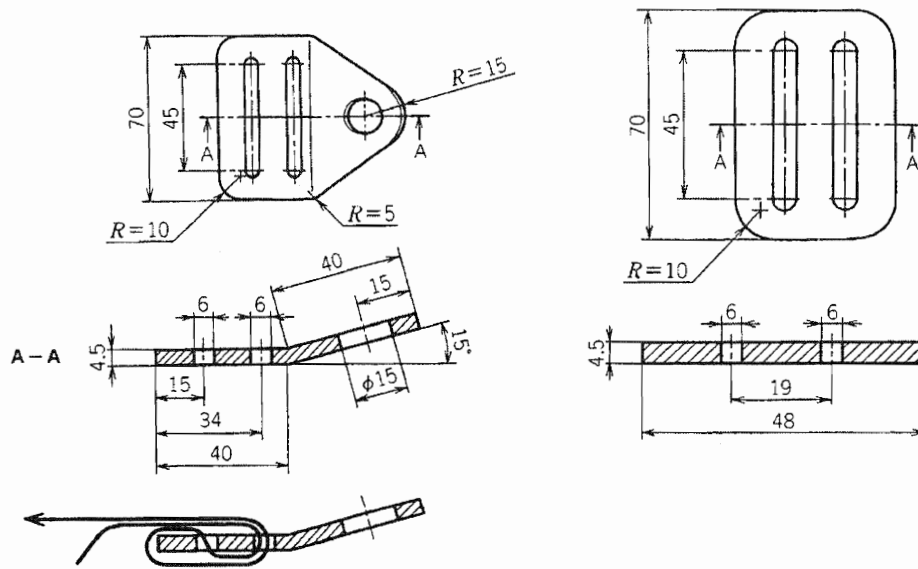
Material: polyester — width:  $48 \text{ mm} \pm 2 \text{ mm}$ , under loading of 10 000 N  
 — thickness:  $1.0 \text{ mm} \pm 0.2 \text{ mm}$   
 — elongation:  $(8 \pm 2) \%$  under loading in accordance with **JIS D 4604** is met

a) **Locking retracted three-point seat belt and two-point seat belt**

**Attached Fig. 7 Seat belt**



Unit : mm

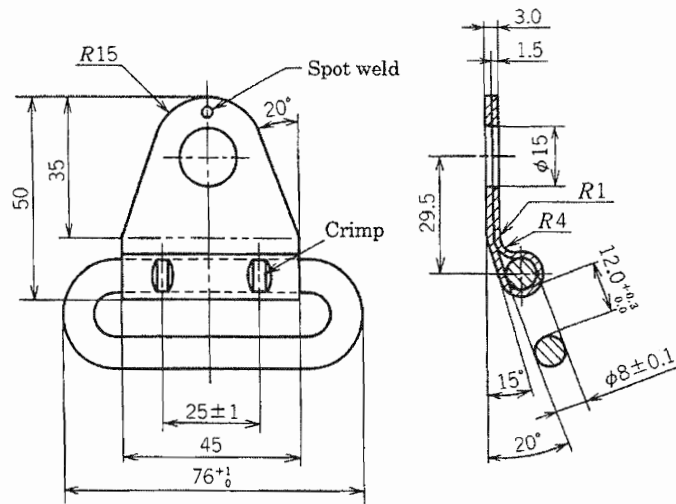


**b) A1 and A2 (standard anchorage plates)**

**c) C (central part)**

Attached Fig. 7 (continued)

Unit : mm



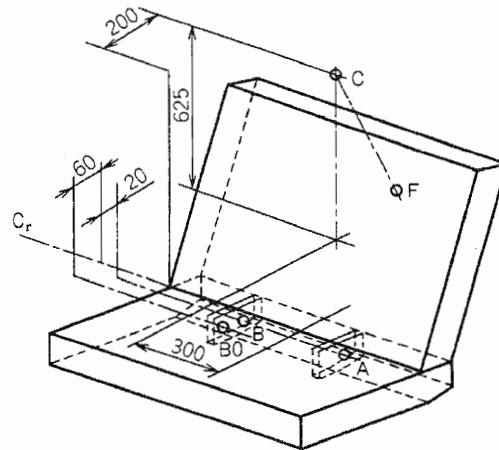
Remarks 1 Use of two-point seat belts shall be as follows. The attaching dimensions are given in Attached Fig. 8.

- 1.1 The two-point belt anchorages shall be fitted at A and B.
- 2 For using a locking retracted three-point seat belt, the following manners shall apply. The attaching dimensions are as given in Attached Fig. 8.
  - 2.1 Belt anchorage A1 shall be fitted to trolley anchorage B0 (outboard).
  - 2.2 Belt anchorage A2 shall be fitted to trolley anchorage A (inboard).
  - 2.3 Belt pillar loop P shall be fitted to trolley anchorage C.
  - 2.4 Belt retractor F shall be fitted to trolley anchorage F.
  - 2.5 Test seats shall be equipped with a locking retracted seat belt as given in Attached Fig. 7 a).

**d) P (pillar loop)**

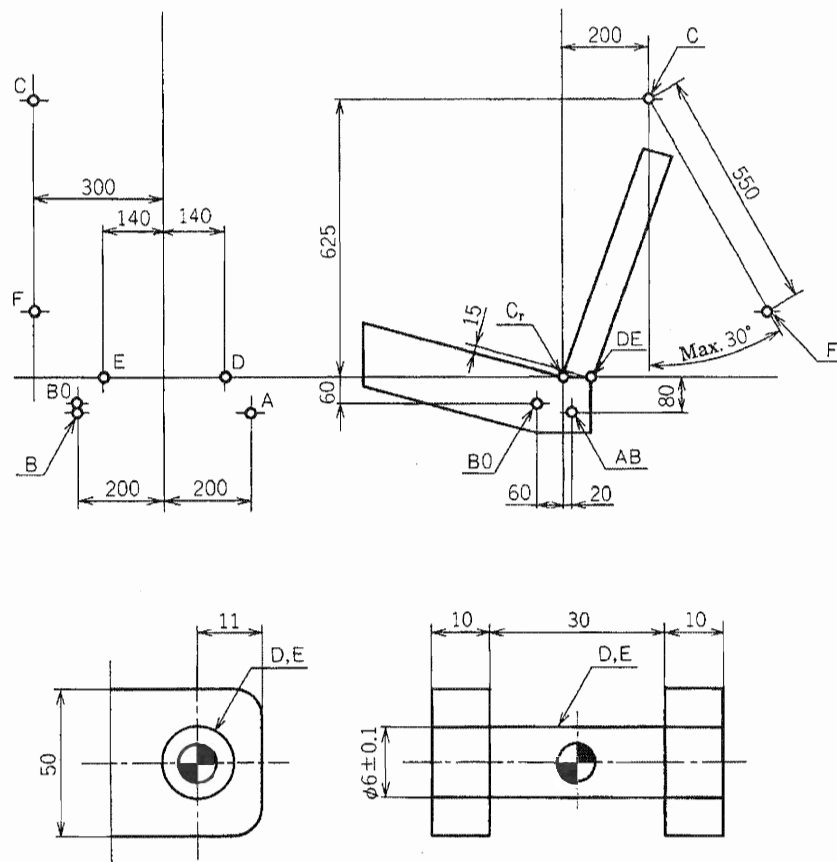
**Attached Fig. 7 (continued)**

Unit : mm



**e) Three dimension drawing of test seat**  
**Attached Fig. 7 (concluded)**

Unit : mm



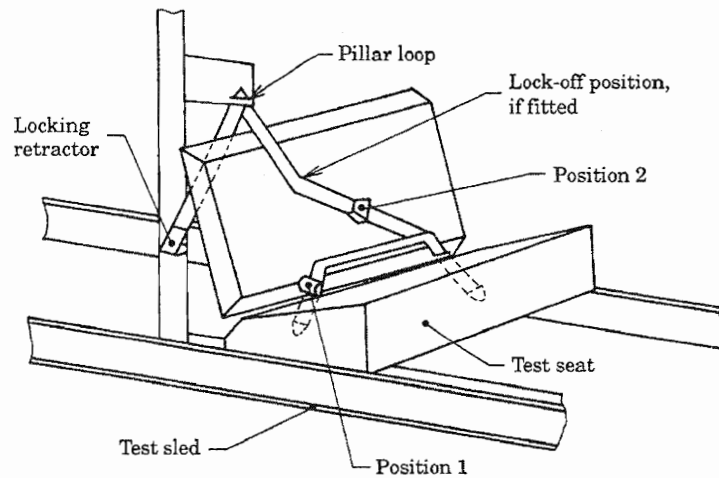
Details of anchorage area

Remarks 1 D and E indicate the location of seat bight anchorage bar.

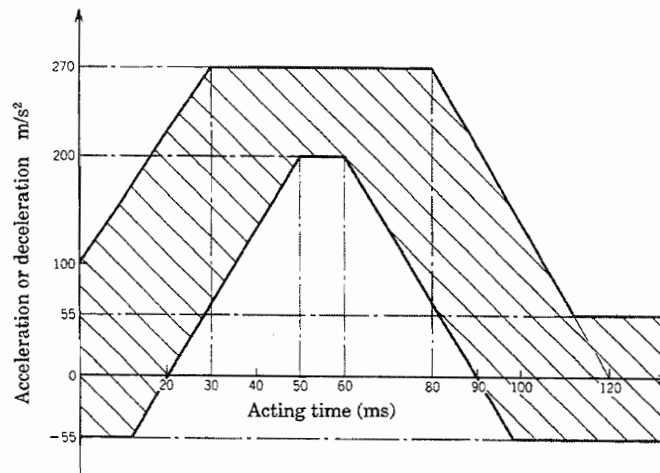
2 The seat bight anchorage bar shall be  $6 \text{ mm} \pm 0.1 \text{ mm}$  in diameter with a length of 30 mm.

**Attached Fig. 8 Seat belt attaching points and seat bight anchorage bar attaching part with the area details**





**Attached Fig. 9 Dynamic load test installation**



Remarks : Curve of the trolley's acceleration or deceleration shall remain within the hatched area shown in the chart. The curve starting origin on the acting time axis need not correspond to 0 ms point of the acting time axis indicated in the chart.

**Attached Fig. 10 Permissible range of the trolley acceleration or deceleration**

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